

The Influence of Excessive Fatness On the Performance of Beef Females

*Robert Totusek, G. L. Holland,
Dudley Arnett, and E. W. Jones*

Many purebred cattlemen, who often fatten heifers to a high degree while fitting for show and striving for maximum development, feel that excessive body fat adversely affects the subsequent productive value of beef females. Although most commercial cattlemen do not feed heifers and cows above a moderate plane of nutrition, experimental results indicate the possibility that productivity may be impaired by levels of energy intake within limits fed by some cattlemen.

Basic information on the effect of a high degree of body fatness is needed. Such information, obtained by studying extreme differences in energy intake, should aid in the interpretation of results from research in which more "practical" differences in plane of nutrition are studied.

The specific objective of this experiment is to determine the influence of excessive body fat on the performance of beef females by inducing a high degree of fatness during the period of growth and development after weaning.

Procedure

Thirteen sets of twin heifers are now on test. Ten of the sets are believed to be identical. One heifer of each set is fed a ration adequate in all nutrients but containing only enough energy to promote gains of one-half to two-thirds pounds per head daily (low level). The second heifer of each set receives a similar ration plus a full feed of corn (high level). Heifers are individually fed in stanchions to facilitate accurate control of feed intake and weight gains of each heifer.

Heifers are bred to calve after 30 months of age. After calving, a ration adequate for maximum lactation is fed to all heifers. Reproductive performance of the heifers is being measured by breeding efficiency, maintenance of pregnancy, ease of calving, and the weight and condition of calves at birth. Milk production is being estimated by the growth rate of the calves, by milking the heifers at regular intervals, and by weighing the calves immediately before and after nursing. Data is also being obtained concerning body measurements, body temperature, certain blood constituents, and gross physiological observations of the reproductive tract.

Results

Eleven sets of twins have attained sufficient age to complete their first lactation. Weight and performance results are shown in Table 1.

High level heifers weighed 320 pounds more at first mating, and 507 pounds more at first calving, than low level heifers. These dif-

body fatness between the two groups of heifers. Most of the sets of twins were maintained on the trial rations at least 12 months before breeding, and in no case was the pre-breeding experimental period less than nine months.

Table 1.—Weight and Performance of Twins Through the First Lactation

Level of Feeding	Low	High
Number	11	11
Average weight (lbs.)		
Beginning of trial	464	460
First mating	679	999
First calving	827	1334
No. services per conception	1.27	1.91
No. cows requiring assistance at calving	1	6 ²
No. calves lost at calving	1	3
No. cows lost	0	2
Birth weight of calves (lbs.)	60	64
Average daily milk production, 112 days (lbs.) ¹	9.2	6.8

¹ Includes data on 10 sets of twins

² Includes two Caesarean sections

Little difference in breeding efficiency was noted between low and high level groups. The relatively poor average efficiency of the high level group (1.91 services per conception) was caused entirely by the failure of the first three sets of high level heifers to conceive readily. Observations indicated that the libido of the bull being used at that time was below normal. The bull was replaced and the subsequent breeding efficiency of the next eight sets of heifers was excellent (1.25 and 1.13 services per conception for low and high level heifers, respectively).

More calving difficulty, greater calf losses, and greater cow losses were observed in the high level group than in the low level group. All but one of the low level heifers calved normally without assistance. Six of 11 high level heifers required assistance at calving. Two of the heifers required Caesarean sections, and two others calved by malpresentation.

One calf was lost at birth in the low level group, apparently due to a covering of placental membranes over the mouth and nostrils. Three calf losses were assessed against the high level group. One calf was dead at birth, another died 10 days after birth, and in a third instance the fetus was reabsorbed at approximately the seventh month of gestation. No cows were lost from the low level group during the first lactation. One high level cow died a month after calving as a result of acute mastitis; another was removed from the experiment after 112 days of lacta-

tion due to a prolapse and stricture of the rectum which may have been caused by difficult calving.

Low level cows produced an average of 35 percent more milk (9.2 vs. 6.8 pounds per cow daily) than high level cows during the first 112 days of their lactation. Average milk production curves showed that the low level cows reached a peak in production between four and six weeks following parturition while the high level cows failed to similarly increase in production during the same period. The production curves of the two groups were approximately parallel after the first six weeks, although the production of the high level cows was at a lower level.

Differences in milk production within sets of twins were not consistent; three high level cows actually produced more milk than their low level mates. Although the limited number of twins in this experiment prevents definite conclusions, a possible treatment-genotype interaction is suggested by the variable milk production trends among various sets of twins. For example, within the three sets of Angus twins, the high level cows produced drastically less milk than their low level mates (5.7 vs. 11.1, 1.9 vs. 11.5, and 1.1 vs. 11.7 pounds milk per cow daily). It would appear that some cows are more susceptible to impairment of milk production from a high degree of body fatness than others.

Since some heifers and calves were lost from the experiment, only five comparisons can be made wherein both low and high level heifers raised their own calves. Within these five sets the average 210 day weights were 374 and 338 pounds for low and high level groups, respectively. There was a high correlation (.75) between milk production and calf gain on a within twin basis. There was a tendency then for low level cows to produce more milk and raise heavier calves than high level cows.

The twin cows are presently in their second or third lactations. Trends noted in the first lactation have continued. Four of 11 cows have been lost from the high level group, and another has failed to rebreed. All of the low level cows remain on experiment and are apparently in a normal, healthy condition.

Hematocrit, hemoglobin, and plasma protein values of high level cows were significantly ($P < .05$) higher than values of low level cows. Red blood cell and white blood cell values followed the same trend, but differences were not statistically significant. Levels of blood constituents of both low and high level cows were within normal ranges, and actual differences between treatments were probably too small to be of physiological importance. Furthermore, it should be remembered that the high level cows had the higher levels of blood constituents, but performance that was inferior to that of the low level cows.

Rectal temperatures were taken daily during four separate 10 day periods. High level cows had a significantly ($P < .05$) higher average body temperature than low level cows. However, the small difference (102.37° F. compared to 102.21° F.) may not be of physiological importance.

Summary

Eleven sets of twin heifers have completed one lactation on test. Results to date show that a high level of body fatness had little influence on breeding efficiency but slightly increased birth weight of calves, and also resulted in increased calving difficulty, lower milk yields and calf weights, and decreased survival rates of both heifers and calves. Levels of certain blood constituents and the average body temperature of fat heifers were higher than the values of low level heifers.

Relative Value of Bermuda Grass Hay Vs. Prairie Hay For Wintering Beef Calves

A. B. Nelson, R. D. Furr, W. C. Elder, and G. R. Waller

Many pasture improvement plans include establishment of Bermuda grass sod for grazing use or the production of hay. The protein content of the forage may vary considerably with fertilization treatments. Because many cattlemen are concerned with the feeding value of Bermuda grass hay, a preliminary study of its value was started at the Lake Blackwell range area in November, 1960.

Procedure

Eighteen weanling grade Hereford calves were divided into two lots (seven heifers and two steers per lot) on November 16, 1960. Each lot was placed in a small pen (about one acre) and fed hay *ad lib.* Those in Lot 1 were fed prairie hay which had been harvested at the range area. The predominant grasses in this hay were little bluestem, big bluestem, switch, and Indian.

The calves in Lot 2 were fed Bermuda grass hay produced at Stillwater under the direction of the Agronomy Department. This was Midland Bermuda grass grown under conditions of adequate moisture, fertilized with 200 pounds of nitrogen per acre for the season, and cut periodically through the summer.

The chemical composition of the hays is given in Table 1. It was estimated that the total protein furnished by the Bermuda grass hay when consumed at a rate of nine to 10 pounds was more than adequate for maintenance of the calves. The digestibility of the protein in both hays was assumed to be 50 percent. The average daily consumption of Bermuda grass hay was 9.20 pounds per head. Calculations based on a total protein content of 13.1 percent and a protein digestibility of 50 percent indicate an assumed digestible protein intake of 0.66 pounds per head daily. The fact that protein is nearly always the limiting nu-